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*Eastern Illinois University*

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Effects of Siblings and Peers on Social Interaction of Children with Autism

BY

Laura E. Welsh, B.S.

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF

MASTER OF SCIENCE

IN THE DEPARTMENT OF COMMUNICATION DISORDERS AND SCIENCES  
EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

2011

I HEREBY RECOMMEND THAT THIS THESIS BE ACCEPTED AS FULFILLING  
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# IMPACT OF SIBLINGS/PEERS ON CHILDREN WITH AUTISM

## **Abstract**

The purpose of this research was to investigate the impact that siblings and peers have on the social skills of children with autism. Subjects included six children with autism between the ages of five and eight years of age. Subjects were observed playing with a typically-developing sibling for two one-hour sessions. Half of the subjects were observed playing with a typically-developing peer for two one-hour sessions. During each structured play session, toys from a preselected set were presented one at a time. The children were instructed to play together with no further adult interaction. Data were analyzed for joint attention, initiation of interaction, imitation, and turn-taking. Results indicated no significant difference in the amount of joint attention, initiation, imitation, or turn-taking when playing with siblings versus peers. This outcome suggested that siblings and peers are capable of eliciting a comparable number of social interactions from children with autism in a controlled environment. Results also suggested that simple interventions, such as structuring play sessions, yield social skills from children with autism.

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I would also like to thank the families that participated in this research. These six families, as well as the families of peers that participated, took time out of their lives to participate in research about autism. Participation from families like these is what will continue to advance our understanding of autism. Their interest and dedication is truly appreciated.

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# IMPACT OF SIBLINGS/PEERS ON CHILDREN WITH AUTISM

## **Chapter 1** **Introduction**

Autism is a disorder that has become increasingly recognized since the 1940's (Kanner, 1943). Children with autism display a "marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction" (American Psychiatric Association, 2000). They also have difficulty developing peer relationships that are age-appropriate, and lack spontaneity in seeking to play and share enjoyment with others. The lack of socialization skills leaves a child with autism content to be isolated. While scientists have sought to understand the social-pragmatic deficits of children with autism, there is little research showing how siblings and peers influence the acquisition of social skills that are necessary for forming relationships with others.

For anyone who has siblings, it is evident that they impact how we learn to interact with others. Siblings, especially those relatively close in age, spend a significant amount of time together throughout childhood. McHale and Croutner (1996) found that during middle childhood, "children spend more time with siblings than with mothers and fathers, or with peers, teachers, or alone" (p. 19). Siblings teach each other about socialization through play, arguments, conflict resolution, perspective taking, and collaboration. There are multiple theories about the ways that siblings influence one another. Two of these are social learning theory and sibling deidentification theory (Whiteman, Becerra, & Killoren, 2009). Social learning theory suggests that younger siblings want to be like their older sibling; whereas, deidentification theory states that children want to

separate themselves from characteristics associated with their sibling. Children who choose the social learning route observe the sibling's actions and consequences in order to evaluate and emulate the sibling's social qualities. Children who choose the deidentification route attempt to disengage from the sibling, and use their sibling as a model of what not to do in social situations.

Peers also have a significant impact on acquisition of social skills. Children begin to imitate their peers during play by the time they are two to three years old (Eckerman, Davis, & Didow, 1989). This imitation forms a foundation for learning social skills when interacting with others. Early relationships with peers involve alternating smiles, gestures, words, and sounds during play (Eckerman, Davis, & Didow, 1989). These early interactions with peers evolve into conversational interactions. As children grow older, they begin to learn social skills through the use of language rather than through play. Peer relationships are particularly important during the preschool and middle school years (Hazen & Brownell, 1999). During these stages of development, children look to their peers to learn social behaviors, how to regulate emotions, and how to cognitively process social situations. Having an abundance of peers at school gives children examples of how to deal with various social situations. Peer models have a significant impact on a child's ability to learn and demonstrate adequate social-pragmatic skills.

Children with autism demonstrate difficulties in social communication. Specific areas of deficit include joint attention, requesting, initiation, topic maintenance, imitation, and turn-taking. Since these skills are necessary for the

development of social-pragmatics, it is important to advance our understanding of how they develop in children with autism.

The majority of children with autism have at least one sibling. The family dynamic and structure may impact the child's social language development. Previous research has focused on sibling- and peer-mediated intervention, while we do not know how play with siblings or peers might influence development of important pragmatic skills.

## **Chapter II**

### **Review of the Literature**

#### **Definition and Diagnostic Criteria of Autism**

As defined by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 2000) autism is characterized by “the presence of markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests” (p. 41). According to the DSM-IV (2000), certain criteria must be met in order for an individual to be diagnosed with autism. A specific number of criteria must be met from each of three categories.

The first category refers to deficits in the individual’s social abilities. The individual must display two of the following: discrepancies in nonverbal behavior (e.g. eye contact, body language, posture and proximity) that interfere with social interaction; difficulty forming relationships with peers; difficulty initiating interactions; and/or difficulty responding to a communication partner’s actions and emotions. The second category refers to deficits in the individual’s communication abilities. At least one of the following symptoms must be present: lack of, or delayed verbal language that is not compensated for by an alternative means (e.g. sign language, augmentative and alternative communication [AAC] device); deficit in the ability to initiate or maintain conversation if verbal language is present; echolalic tendencies; and/or a lack of imaginative play and spontaneous language. The third category refers to repetitive behaviors and narrow interests with which an individual with autism may become intensely occupied. At least one symptom must be demonstrated, and may include:

abnormal preoccupation with at least one interest or activity; difficulty shifting activities or breaking an established routine; displaying repetitive motor movements (e.g. hand flapping); and/or an infatuation with specific parts of objects or toys rather than properly using the whole object or toy. In addition to the previously stated criteria, the DSM-IV (2000) also stipulates that the individual must develop the above symptoms before the age of three years (American Psychiatric Association, 2000).

**Prevalence.** According to Kogan et al. (2009), one in every 91 children presents with an autism spectrum disorder. This is a statistic that has significantly increased throughout the past two decades. A specific reason for this trend has not been identified.

**Characteristics.** There are many characteristics that are observed among individuals diagnosed with autism. Though not all individuals with autism display the same symptoms, the characteristics discussed below have been consistently presented by a majority of individuals who have autism.

Deficits in the social interaction of children with autism can be noted in early stages of life. Before the age of one, a typically developing child is able to follow a communication partner's eye gaze to an object, and understand that the identified object is significant. By nine months, the child is able to establish joint attention, or the ability to coordinate attention between a communication partner and an object of mutual interest (Bruner, 1995). A child with autism struggles to exhibit joint attention, and does not comprehend that his communication partner expects him to look at a mutual object. Additional social communication deficits

noted in children with autism before one year of age include “desynchronization of vocal patterns with the caregiver, early sharing of affective expression, delayed onset of babbling, and lack of gesture” (Landa, 2007, p. 17). In subsequent years, the child displays diminished communicative intent and expression, and may lose language skills that were once present (Landa, 2007).

Children with autism have difficulty forming relationships, and are typically not interested in doing so. They are content to play on their own, and prefer not to interact with other children. They neglect to acknowledge the interests of others, and have difficulty interpreting subtle social cues (e.g., sighing to indicate boredom with a toy) (Schreibman, 2005).

It is common for a child with autism to display stereotypic fine and gross motor behaviors, as well as ritualistic verbal behaviors. These behaviors may be produced in response to an unpleasant stimulus (e.g., a loud noise) or “to provide the child with sensory feedback or to reduce the anxiety often displayed when the behaviors are blocked” (Schreibman, 2005, p. 37). Sometimes a child with autism blocks a behavior, or holds back from doing the behavior because s/he is aware of its inappropriateness, or because someone told him/her to stop the behavior. Blocking may lead to increased anxiety and cause worse behavior. Some common stereotypic behaviors include “hand flapping, finger flicking, rocking, and circling movements” (Richard, 1997, p. 38). These self-stimulatory behaviors may occur when the individual feels that his or her world is being intruded upon, or when a situation becomes anxiety-provoking and overwhelming (Richard, 1997).



## IMPACT OF SIBLINGS/PEERS ON CHILDREN WITH AUTISM

There are five areas of language which include pragmatics, semantics, morphology, phonology, and syntax. Pragmatic language refers to an individual's social language. The semantic area of language refers to an individual's understanding of vocabulary, concepts, and directions. Morphology and syntax refer to grammar and sentence construction in language. Finally, phonology refers to understanding the symbol-sound correspondence and identification of speech sounds within a language. The areas of language that are most significantly affected by autism include semantics (especially as language becomes more complex and involves concepts, reasoning, and problem solving) and pragmatics (Eigsti, Bennetto, & Dadlani, 2007; Richard, 1997). Additional areas of deficit may include syntax and morphology. Phonology is not an area of significant deficit in children with autism (Bartolucci & Pierce, 1977; Boucher, 2009).

Syntactic and morphological problems shown by children with autism include reduced utterance size, improper sentence structure, and morphological errors (Eigsti, Bennetto, & Dadlani, 2007). Understanding grammar and sentence structure involves learning how to combine words to create phrases and sentences. Learning grammatical categories (e.g., noun, verb, adjective) and grammatical elements of language (e.g., morphemes: -ing, -ed) are also essential to syntactic competence. Children with autism produce fewer grammatical morphemes than typically developing children, particularly in regard to verb tenses (Bartolucci, Pierce, & Streiner, 1980). One theorist suggested that the syntactic problems displayed by children with autism evolve from their

difficulty sequencing stimuli and their problems encoding rules for structuring language (Dalglish, 1975).

Eigsti, Bennetto, and Dadlani performed a study in 2007 to determine differences in syntactic development of children with autism, children with developmental delays, and typically developing children. They used the *Index of Productive Syntax* (IPSyn) to score transcripts of their observations for “56 different syntactic and morphological forms of progressively greater complexity” (Eigsti, Bennetto, & Dadlani, 2007, p. 1012). The syntactic complexity of measured utterances ranged from one-word utterances to multiple-word sentences. The study determined that children with autism used significantly less complex syntactic construction of phrases and sentences. Children with autism had significantly lower mean length of utterance (MLU) than children with delayed and typical development. They used jargon rather than words and sentences, and conversed about less complex events (Eigsti, Bennetto, & Dadlani, 2007). Some children with autism also present with echolalia. The inability to construct novel utterances causes expressive language deficits, as the child is unable to express language that is appropriate to a given context.

Semantic skills are also a primary area of deficit in children with autism (Fay & Schuler, 1980; Hermelin & O'Connor, 1967; Tager-Flusberg, 1981).

Semantics involves the child's ability to understand the meaning of language. It is unclear whether semantic deficits in autism are related to a lack of semantic acquisition, or a lack of ability to use what is acquired (Tager-Flusberg, 1989). Children with autism struggle to create semantic categories. In a study by

Hermelin and O'Connor (1967), children with autism and typically developing children were given a list of words and asked to recall the words. In contrast to typically developing children, children with autism did not reorganize the words by semantic categories, but repeated the words back in the order that they were presented. Other semantic deficits include a lack of understanding advanced language and concepts. Children with autism interpret the meaning of language literally (Boucher, 2009).

In regard to pragmatic language, children with autism have difficulty using appropriate language in social situations, as well as comprehending social language. Receptively, they understand language on a literal level; however, "analogies, metaphors, and humor are essentially incomprehensible" (Schreibman, 2005, p. 36). It is not uncommon for a child with autism to lack understanding of jokes or sarcasm. They interpret language as it is stated and ignore non-verbal intonation and signals, such as facial expression.

### **Communicative Intent**

Social communication encompasses skills such as nonverbal expression, initiating and terminating conversations, and topic maintenance. There are various reasons individuals communicate, including expression of wants and needs, desire for social interaction, and yearning to convey emotions or feelings. According to Owens (2004), intentionality and the ability to share thoughts with other people develop at about eight months of age. This is the first time that most children take their audience into consideration. Joint attention, initiation, and turn-taking are first exhibited as prelinguistic forms (e.g., pointing, crying, reaching for an object or person), and later as language-based interactions

Children with autism display differences in communicative intent early in development. Volkmar, Chaarska, and Klin (2005) found that a major difference in children with autism compared to typically developing children is lack of joint attention. Typically developing children communicate for the purpose of social interaction; whereas, children with autism communicate to request wants and needs or to protest (Prizant & Wetherby, 1987). Relationships are not a primary concern for individuals with autism; basic necessities are often a greater motivation to communicate.

Typically developing children move quickly through the prelinguistic stages of development, and on to using speech and language (Keen, Sigafos, & Woodyatt, 2005). Children with autism spend more time in the prelinguistic stages, and many have difficulty developing verbal skills. Some children with severe autism may never produce verbal linguistic output, and continue to struggle with prelinguistic stages of communication development.

According to Bruce and Vargas (2007), "The importance of intentional communication to later symbolic development in children with severe disabilities has only been explored in the past few years" (p. 300). Evaluating and observing early linguistic abilities among children with autism yields information that can predict their later language development. When children with autism have difficulty in prelinguistic stages, they will likely continue to have difficulty with later developing language also (Smith, Mirenda, & Zaidman-Zait, 2007).

**Joint Attention.** In 2000, Carpenter and Tomasello defined joint attention as the ability to coordinate attention between a conversational partner and an

object or event in the environment. Joint attention is considered an important foundation for the development of language. A critical aspect of early social development in children is the ability to share and coordinate interest in an external object or event with another individual. In typically developing children, this skill usually emerges effortlessly between the ages of nine and fifteen months. In children with autism, joint attention emerges later, between seventeen and thirty months of age (Clifford & Dissanayake, 2008; Siller & Singman, 2008; Whalen & Schreibman, 2003).

Whalen and Schreibman (2003) found that children with autism displayed deficits in initiating and responding to joint attention with adults. Initiating joint attention was significantly more impaired than responding to joint attention. Joint attention is a critical aspect of identifying autism (Naber et al., 2008; Whalen & Schreibman, 2003). It is also important to determine if factors in the child's environment facilitate joint attention. Acquiring the ability to initiate and respond to joint attention is vital for the development of appropriate social and conversational skills.

**Initiating.** Loftin, Odom, and Lantz (2008) defined initiation as an interaction with a peer that was started by the subject after lack of interaction for at least five seconds. Initiation does not encompass responding moves, such as following a direction or answering a question, and is a more advanced language skill than responding. Initiation can be used for a variety of communicative purposes, including, but not limited to, requesting, commenting, and protesting. Initiating conversations or interactions is an important social-pragmatic skill.

Children with autism have difficulty initiating conversation or pragmatic interactions (Bishop, Gahagan, & Lord, 2007; Loftin, Odom, & Lantz, 2008). Murray, Ruble, Willis, and Molloy (2009) collected data via parent and teacher surveys regarding the social skills of children with autism. Results indicated that “skills related to [...] initiating and maintaining interactions with others received the lowest mean ratings by both parents and teachers” (p. 111).

**Turn-Taking.** Turn-taking involves verbal or non-verbal interaction between at least two individuals who have joint attention with the same object, conversation, or event. Precursors to turn-taking begin in infancy when a baby accepts a bottle from her mother. Crying is another precursor to turn-taking. An infant learns that when he or she cries, the mother is quick to respond. Precursory turn-taking in conversation begins with learning to take turns and imitate during games and routines, such as peek-a-boo (Owens, 2004). Over time, the child and mother begin to shift roles, and the child initiates interaction. Intentional turn-taking may begin as early as four months when a child responds to his mother saying “Look!” by following a point with eye gaze (Owens, 2004). Turn-taking may include verbal and/or non-verbal gestures that alternate with verbal and/or non-verbal gestures from a communication partner.

Turn-taking during games and routines may consist of gestures and facial expressions that suggest it is the play-partner’s turn. Gestures and facial expressions may include raised eyebrows, widened eyes, open mouth, and repositioning of the head and body (Owens, 2004). Turn-taking is learned through simple games when there is a pause for the child’s response, combined

with a look of expectancy from the play partner. This pause teaches the child that he or she needs to take a turn in order for the interaction to continue. Too few pauses from a play partner may lead to overstimulation and a lack of reciprocity from the child (Owens, 2004). These early turn-taking skills develop into conversational turn-taking in typically developing children.

Children with autism have difficulty with turn-taking skills. A lack of reciprocity may be due to behaviors that interfere with social interaction, such as repetitive behaviors, compulsive tendencies that are more motivating than social interaction, or impulsiveness (Peeters, 1997). These factors may influence the time spent interacting with another child, and therefore reduce turn-taking behaviors. An additional contributor to a lack of turn-taking in children with autism is that children with autism may be unaware of the need to take turns, given their disinterest in others and poor understanding of the functions of communication (Wetherby & Prutting, 1984).

**Imitation.** Imitation is defined as reproducing a model's verbal or non-verbal action in the same manner as the model (Radhakrishn, 2010). Early imitation behaviors lead to later acquisition of social, cognitive, and language skills (Radhakrishn, 2010). Imitation begins in infancy, for example when a baby learns to imitate his parents waving.

Children with autism have difficulty with imitation. These children display specific imitation deficits including imitation of action on objects, vocalizations, body movements, and facial expression (Radhakrishn, 2010). The impaired development of imitation skills is due to a deficit in mapping the neural codes for

carrying out an action between the sensory and motor modalities (Williams, Whiten, & Singh, 2004). This theory indicates that a lack of imitation in children with autism is not due to lack of motivation to imitate, but rather is neurological in nature.

### **Siblings**

Autism affects a child's entire family. Some studies have addressed the negative impact of autism, such as a 1991 study performed by Bagenholm and Gillberg. Results of this study revealed that siblings of children with autism experience more difficulty in forming and maintaining relationships than children who do not have a child with autism in their families. Research also indicates that siblings of children with autism have negative attitudes regarding the child with autism in their family. Aksoy and Bercin Yildirim (2008) studied the attitudes of siblings of children with varying disabilities. Results indicated that children who had siblings with autism felt the highest amount of animosity toward their siblings compared to children who had siblings with other disabilities.

Other research indicates that siblings can have a positive impact on a child with autism from an instructional standpoint. El-Ghoroury and Romanczyk (1999) observed play interactions of family members with children with autism. Although the mother and father often initiated more play with the child with autism than siblings did, the child with autism initiated more play interactions with a sibling than with the parents.

Bass and Mulick (2007) composed a review of the literature regarding sibling- and peer-mediated therapy for improving the social skills of children with



autism. This research showed that after sibling-mediated intervention, “generalization was evidenced by each child with autism initiating and maintaining interactions [...] with their sibling at home” (p. 732). Bass and Mulick also found that children with autism are able to generalize skills learned during therapy sessions to other environments.

Research has determined that trained siblings can have a positive impact on social skill development of children with autism (Baker, 2000; Bass & Mulick, 2007; El-Ghoroury & Romanczyk, 1999; Knott, Lewis, & Williams, 2007; Tsao & Odom, 2006). The literature lacks research that determines the impact that siblings have on these skills without formal training. Siblings share the same home environment as the children with autism, and could prove to positively impact their communicative abilities as a result.

**Delayed Younger Siblings.** Toth, Dawson, Meltzoff, Greenson, and Fein (2007) examined the relationship between the development of children with autism and their typically developing siblings. They found that “siblings as a group were below average in expressive language and composite IQ, had lower mean receptive language, adaptive behavior, and social communication skills, and used fewer words, distal gestures, and responsive social smiles than comparison children” indicating that “the development of young non-autistic siblings is affected at an early age” (p. 145). Having a sibling with autism could contribute to these deficits in a number of ways. Siblings of children with autism do not have a model to demonstrate appropriate communication skills. Younger siblings may not receive as much attention from parents. Parents should monitor

development of the typically-developing siblings and implement appropriate interventions as necessary (Toth et al., 2007). Though siblings of children with autism have a higher risk of having delayed language, cognitive, and social skills, not all siblings acquire these delays.

**Sibling Influences on Development.** In regard to sibling relationships, Knott, Lewis, and Williams (as cited in Baker, 2000) stated that, "Often early social development for children begins with interactions with their siblings. Sibling interactions play an important part in the social life of a child with or without disabilities" (p. 66). Siblings exert social and cognitive influences upon one another throughout childhood and adolescence (Whiteman, Becerra, & Killoren, 2009). Typically developing siblings spend a lot of time together, and often develop an emotional connection. Direct interaction with siblings assists neurotypical children in developing important social skills, such as "conflict resolution, perspective taking, negotiation, compromising, cooperation, and other forms of social competence" (Brody & McBride-Murry, 2001; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Katz, Kramer, & Gottman, 1992).

In order for siblings to learn from one another, certain conditions must be met. Bandura (1977) developed four prerequisites to observational learning. The first is that a model for behavior must have salient characteristics that attract the observer's attention. Because of the time that siblings spend together throughout childhood, it is likely that siblings are salient models for one another. The second prerequisite is that the model must further attract the attention of the observer by possessing attractive qualities, such as a nurturing personality. The more

attractive the qualities, the more likely the observer will want to observe and emulate them. A third prerequisite to observational learning is that the model is similar to the observer. Based on this principle, siblings of the same gender may be more likely to learn by observing one another than opposite-sex siblings. The final prerequisite is that the observer must be motivated to produce the behaviors that are learned (Bandura, 1977). Given the exposure of siblings to one another, and the likelihood that observational learning will occur, Bandura (1977) argued that using sibling participation in therapy can be an important intervention strategy.

To expand on the idea of using siblings as interventionists, McHale and Crouter (1996) found that in middle childhood, siblings spend more time together than they do with their mother, father, peers, teachers, or by themselves. Siblings continue to spend a large amount of time together into adolescence. The availability of siblings makes them ideal candidates to incorporate into social interventions for children with autism. The amount of time that siblings spend together when one sibling is disabled does not differ significantly from the time that two typically developing siblings spend together (McHale & Gamble, 1989; McHale & Harris, 1992). Rather, the types of activities engaged with a disabled sibling differed from activities initiated by two typically developing siblings (McHale & Gamble, 1989; McHale & Harris, 1992). Siblings of a disabled child reported that they spent more time engaging in care-giving than play activities.

Little research has examined social interaction of a child with autism and his or her siblings. Since children with autism have a difficult time interacting with

their peers, play with their brothers and sisters may not be natural (Koegel & Egel, cited in Baker, 2000). Children with autism often prefer to play alone rather than with a sibling. In a study involving sibling pairs composed of one child with autism and a typically developing sibling, the typically developing child made twice as many initiations as the developmentally disabled child. Siblings with autism responded to only half of the typically developing siblings' attempts at initiation (Knott, Lewis, & Williams, 2007). Siblings may have an advantage over peers when interacting with the child with autism because the siblings have the opportunity to observe adults interacting with the child on a regular basis. Siblings are able to see how the parents engage with the child with autism, and have the opportunity to imitate the parents' actions. In contrast, peers see parents interacting with the child less frequently, and therefore do not have as much of an opportunity to learn techniques from the parents.

**Sibling-Mediated Therapy.** Though not much is known about the quality of joint attention, initiating, turn-taking, imitating, and other social skills between a child with autism and his or her sibling, there is a substantial amount of literature that pertains to therapy mediated by a typically developing sibling. A study by Tsao and Odom (2006) observed how sibling-mediated therapy affected the development of social skills in children with autism. During this study, the researchers trained typically developing siblings to keep their sibling with autism engaged in an activity, as well as how to elicit social behaviors. They measured social interaction based on three dependent variables: (1) child orientation, (2) social behavior displayed by the child with autism toward the sibling, and (3)

social behavior displayed by the sibling toward the child with autism. Joint attention was the major social interaction measured for the first variable, child orientation. For the second and third dependent variables, social behavior of the child with autism or the sibling, multiple measures of socialization were used. These included initiation, negative initiation, response, negative response, and no social behavior. Initiation was defined as “any verbal or motor behaviors clearly directed toward a sibling/focal child to evoke a response,” such as a greeting, asking and answering questions, commenting, sharing materials, or helping behaviors (Tsao & Odom, 2006, p. 110). Responses were defined as a “reply within 5 seconds, such as looking when the name was called, following a direction or request, answering a question, or nodding his head” (Tsao & Odom, 2006, p. 110). Negative social initiations and responses were “harmful or disruptive verbal/motor behaviors, such as hitting, pushing, kicking, or biting that was clearly directed toward a sibling/focal child” (Tsao & Odom, 2006, p. 110).

Results indicated that three out of the four children with autism demonstrated a modest increase in social interaction following sibling-mediated therapy (Tsao & Odom, 2006). They showed increased orientation for measuring joint attention. Two of the four children with autism demonstrated increased initiation; and all subjects showed increased social responses to their siblings. All subjects reduced the amount of time in which no social behavior occurred. This indicated that treatment increased the amount of time that subjects engaged in social behavior with siblings. The study indicated that using siblings as therapists may be beneficial for increasing the social skills of children with

autism, specifically in the areas of joint attention, initiation, and responding to sibling social initiation. Results were consistent with other research findings presented below (Bass & Mulick, 2007; El-Ghoroury & Romanczyk, 1999).

In a study by Bass and Mulick (2007), siblings were taught to facilitate intervention by engaging the child with autism in play-based situations, incorporating thematic rituals in the play, and encouraging their sibling with autism to respond and interact. The typically developing child was also taught to praise his or her sibling with autism when desired behaviors were displayed. Following sibling-mediated intervention, the ability to use skills taught by typically developing siblings generalized to interactions with new peers in novel situations (Bass & Mulick, 2007).

### **Peers**

There is extensive research regarding the effects of peer-mediated therapy on social skill development of children with autism (El-Ghoroury & Romanczyk, 1999; Gonzalez-Lopez & Kamps, 1997; Harper, Symon, & Frea, 2008; Kamps et al., 2002; Koegel, Werner, Vismara, & Koegel, 2005; Kohler, Greteman, Raschke, & Highnam, 2007; Laushey & Heflin, 2000; Licciardello, Harchik, & Luiselli, 2008; Orsmond, Krauss, & Seltzer, 2004; Owen-DeSchryver, Carr, Cale, & Blakeley-Smith, 2008; Pierce & Schreibman, 1997; Sperry, Neitzel, & Engelhardt-Wells, 2010). In general, these studies have found that trained peers have the ability to improve the social skills of children with autism. However, the literature is lacking information regarding the impact that untrained

peers can have on the social pragmatic skills of children with autism in a guided naturalistic environment.

**Peers' Feelings Toward Children with Autism.** A majority of typically-developing children enjoy participating in social skill groups that strive to improve the social skills of children with autism (Kamps et al., 1998). In a study done by Kamps et al. (1998), 203 elementary school children were interviewed regarding their participation in social skill groups and other various activities with children who had autism. Additional activities included assisting during PE and art, tutoring, and taking part in class buddy programs. The social groups were arranged by the teachers, and involved playing with toys and games and practicing specific social skills that were modeled by the teachers. Some of these social skills included turn-taking, helping others, requesting materials, and imitating each other. Following the social skill intervention, typically-developing peers, as well as the children with autism were interviewed. The participants were asked what they liked about the groups, and what they did not like. Typically-developing students were also asked about their feelings regarding working with the children with autism. This study found that 80% of the typically-developing peers interviewed enjoyed participating in the social skill groups with the children with autism. Also, the participants were accepting and excited about interacting with these children. These positive outcomes support the use of peers for improving the social pragmatic skills of children with autism.

**Peer Influences on Development.** Bass and Mulick (2007) stated that, "Peer-mediated approaches represent the largest and most empirically supported

type of social intervention for children with autism” (p. 727). Recent literature shows evidence of successful peer-mediated therapy in facilitating acquisition of social skills in children with autism (Bass & Mulick, 2007; Garfinkle & Schwartz, 2002; Harper, Symon, & Frea, 2008; McConnell, 2002). In a study developed by Garfinkle and Schwartz (2002), peer imitation was used to increase social skills and interaction of preschool children in a preschool setting. During baseline, social interactions of subjects with autism were observed during small group and free play. Intervention began by training the small groups to implement peer imitation. The teacher who ran the small groups explained that children would take turns being the leader for the small group, and all children who were not the leader for that day were instructed and prompted to imitate the leader. Though no peer imitation was noted for any children with autism during baseline data collection in the small group or free play settings, a slight increase in peer imitation was noted during the treatment phase within both settings. This demonstrated that peers who are given direct instruction are able to increase the social pragmatic behaviors of children with autism.

A 1997 study looked at the impact of peer-mediated therapy on increasing social language use and variation of toy use for two children with autism (Pierce & Schreibman, 1997). In this study, multiple peers were trained in Pivotal Response Training (PRT) to increase social interaction of the children with autism. The dyads were observed at baseline with no training. Typically-developing peers were then trained in PRT during recess by two researchers. Training took place in the classroom. Strategies were first modeled and



explained by the therapists, and then role played with each peer. During training, the peers were taught how to gain attention, provide choices, vary the toys, model social behavior, reinforce attempts, encourage conversation, extend conversation, take turns, and narrate play. The peers were then given the opportunity to implement PRT for the subjects with autism. Results showed that the frequency and quality of language improved for both subjects following intervention. Subjects talked more, and produced longer sentences. Though the subjects did not increase the number of toys they played with per session, the range of toys played with over all sessions increased greatly. At baseline, both children played with the same three to four toys during each session; after intervention, the subjects played with a total of fifteen to twenty different toys over multiple sessions (Pierce & Schreibman, 1997).

The current literature is supportive of the use of trained peer-mediators for social pragmatic intervention for children with autism. The literature does not, however, identify the success that untrained peers have in eliciting social behavior from children with autism. The literature is also lacking information regarding the use of a peer versus a sibling for intervention. Many successful sibling- and peer-mediated studies exist, but there are no studies that compare the effect of siblings and peers in improving social skills of children with autism.

### **Research Questions**

A significant amount of literature is available regarding peer- and sibling-mediated therapy in developing the social-pragmatic skills of children with autism. The literature shows that typically-developing siblings and peers who

receive training are able to increase the social skills of children with autism. The effects of siblings and peers who are not trained to interact with children with autism has not been researched. This study will determine whether untrained siblings and peers are able to increase the social skills of children with autism during structured play. It will also examine whether siblings or peers are more successful in eliciting social behavior. The researcher will evaluate the following research questions:

1. Do peers and/or siblings impact the social-pragmatic development of children with autism?
  - a. Do children with autism show more joint attention when interacting with peers or siblings?
  - b. Do children with autism show more initiation when interacting with peers or siblings?
  - c. Do children with autism show more turn-taking when interacting with peers or siblings?
  - d. Do children with autism show more imitation when interacting with peers or siblings?
2. Of the subjects observed with a sibling and a peer, do they display more joint attention, initiation, turn-taking, and imitation with a sibling or with a peer?
3. What techniques did siblings/peers use to facilitate social-pragmatic skills in children with autism?

### **Chapter III Methodology**

#### **Subject Selection**

Six subjects were recruited through the Eastern Illinois University Speech-Language-Hearing Clinic, local school districts, local respite programs, and Easter Seals. All subjects presented with autism and were between the ages of 5:0 and 8:0. Diagnoses of mild to severe autism and no more than moderate cognitive deficits were reported by parents and confirmed in professional reports. All subjects had at least one sibling who was within four years of the subject's age and was willing to participate in the study. Three of the subjects also had a peer who was within five years of his or her age. Familiar peers were chosen by the subject's parents, and included friends, classmates, and cousins. Familiar peers were individuals who were in the same environment as the subjects on a regular basis (e.g. school, community), but did not interact regularly with the subjects. All subjects, siblings, and peers involved in the study had normal visual and hearing acuity, and no additional developmental disabilities, per parental report. All siblings and peers were typically developing based on parental report. Table 1 displays the chronological age of all participants.

**Table 1.** Chronological Age of Subjects, Siblings, and Peers

	<b>Subject Age (years:months)</b>	<b>Sibling Age (years:months)</b>	<b>Peer Age (years:months)</b>
<b>Sub. 1: DH</b>	5:5	3:2	8:1
<b>Sub. 2: KM</b>	5:10	7:1	10:1
<b>Sub. 3: CC</b>	6:1	2:7	---
<b>Sub. 4: GC</b>	5:5	4:4	4:11
<b>Sub. 5: AL</b>	8:2	6:1	---
<b>Sub. 6: ED</b>	7:11	6:1	---

While delayed in the use of social-pragmatic skills, subjects demonstrated occasional joint attention, initiation, imitation, and turn-taking behaviors, as evidenced by parental report. If the subjects had more than one sibling within five years of age, the sibling closest in age participated in the study.

Data were grouped for analysis in the following manner. Group one consisted of thirteen 60-minute play sessions of subjects 1-6 observed with typically-developing siblings. Group two consisted of six 60-minute play sessions of subjects 1, 2, and 4 observed with typically-developing peers. Data were extrapolated for one sibling session and four peer sessions to make all sessions 60-minutes long. Details regarding the procedure for extrapolating data are discussed in the results chapter.

### **Variables**

Four dependent variables were established for this study. These included joint attention, verbal and nonverbal initiation, imitation, and turn-taking. Joint

attention was measured by counting the number of times the child with autism directed the attention of his sibling or peer (e.g., looked at object, looked at sibling/peer, looked back at object or looked at the sibling/peer, looked at the object, looked back at the sibling/peer). Table 2 explains which behaviors were counted as joint attention.

Initiation was measured by counting the number of times the child with autism began an interaction after 10 seconds passed with no interaction. Table 3 explains which behaviors were counted as initiation.

Imitation was measured by counting the number of times the child with autism imitated a verbalization or action initiated by the play partner. Table 4 explains which behaviors were counted as imitation.

Turn-taking was measured by counting the number of times the child with autism responded, verbally or non-verbally, to an interaction initiated by the play partner (e.g., looked at play partner after being addressed by name, responded to a question that was asked). Table 5 explains which behaviors were counted as turn-taking.

**Table 2.** Counting Joint Attention Behaviors

Scorable Behavior	Non-Scorable Behavior
<ul style="list-style-type: none"> <li>• Gaze from object to sibling/peer back to object</li> <li>• Gaze from sibling/peer to object back to sibling/peer</li> </ul>	<ul style="list-style-type: none"> <li>• Mutual gaze</li> <li>• Looking at the object at the same time as the sibling/peer</li> <li>• Looking at the sibling/peer then the object</li> <li>• Looking at the object then sibling/peer</li> </ul>

**Table 3.** Counting Initiation Behaviors

<b>Scorable Behavior</b>	<b>Non-Scorable Behavior</b>
<ul style="list-style-type: none"> <li>• Touching sibling's/peer's arm and taking him/her to activity</li> <li>• Greeting gesture</li> <li>• Conventional gesture directed at sibling/peer with or without response from sibling/peer</li> <li>• Conventional gesture combined with vocalization/verbalization directed at the sibling/peer</li> <li>• Vocalization/verbalization directed at the sibling/peer</li> </ul>	<ul style="list-style-type: none"> <li>• Verbalization/vocalization not directed at a sibling/peer</li> <li>• Conventional gesture not directed at sibling/peer</li> <li>• Subject grabbing object/toy from sibling/peer</li> </ul>

**Table 4.** Counting Turn-Taking Behaviors

<b>Scorable Behavior</b>	<b>Non-Scorable Behavior</b>
<ul style="list-style-type: none"> <li>• Response (verbal or nonverbal) to a question or prompt initiated by the sibling/peer</li> <li>• Taking an object from sibling's/peer's hand when held out</li> </ul>	<ul style="list-style-type: none"> <li>• Fails to respond (verbal or nonverbal) to a question or prompt initiated by a sibling/peer</li> <li>• Initiation of interaction</li> </ul>

**Table 5.** Counting Imitation Behaviors

<b>Scorable Behavior</b>	<b>Non-Scorable Behavior</b>
<ul style="list-style-type: none"> <li>• Imitation of sibling/peer behavior through verbalization/vocalization</li> <li>• Imitation of sibling/peer behavior through action/gesture</li> </ul>	<ul style="list-style-type: none"> <li>• Fails to imitate sibling's/peer's behavior through verbalization/vocalization</li> <li>• Fails to imitate sibling's/peer's behavior through action/gesture</li> </ul>

Some communicative behaviors could have been classified as more than one of the dependent variables. In order to prevent artificial inflation of the data, each communicative act was counted only once. When the subject displayed a

communication act following a period of 10 seconds of no interaction, it was considered initiation. When the subject shifted his/her eyes between the play partner-object-play partner or object-play partner-object, the communicative act was considered joint attention. When the subject responded to an initiation by the play partner, the communicative act was considered turn-taking. When the subject observed the play partner and repeated the play partner's actions or verbalizations, the behavior was counted as imitation.

An additional variable within the study was the level of severity of autism for each subject. Though all subjects had a written diagnosis of autism according to parental report, the subjects ranged from mild to severe autism. This variable could not be controlled due to a lack of participants.

The time of day that each dyad was observed varied. This could not be controlled, as coordination of schedules of the researcher and families did not allow for continuity across subjects, or across all sessions for one subject.

Previous therapy in social skills (e.g., joint attention, initiation, imitation, and turn-taking behaviors) was also not controlled in this research. Previous therapy for pragmatic skill development may have influenced the results; however, it is likely that pragmatic skills were consistent across communication partners.

Due to the fact that observations occurred in the home and clinical setting, the environments for sessions varied for each subject. The setting for each observation was controlled by making modifications to the room arrangements. For sessions that took place in the home, families were asked to choose a room

with minimal distractions (e.g., television), and to remove toys and games that were present in the room. Sessions that took place in the Eastern Illinois Speech-Language-Hearing Clinic occurred in therapy rooms that contained only a table and chairs. This allowed for control of each subject's environment, and created similarities between therapy rooms in the clinic and rooms in the subjects' homes.

All siblings and peers were within five years of age of the subjects; however, the researcher did not control whether siblings and peers were older or younger than the subjects. Gender of the siblings and peers was also not controlled.

### **Research Design**

This study utilized a group comparative design, which allowed for relative comparison of experimental conditions. Group one consisted of thirteen observations of six children with autism and their typically-developing siblings, while group two consisted of six observations of subjects 1, 2, and 4 with their typically-developing peers. A case study design was also utilized to analyze data for individual subjects observed with a sibling and a peer.

### **Procedures**

The researcher observed social interactions of six subjects with siblings, and three subjects with peers. The dyads were presented with classic toys and games that provided an opportunity for social interaction. The toys and games that were presented are listed in the following table.



**Table 6.** Selected Play Activities

• Playdough	• Bubbles
• Puzzles (floor and peg)	• Play food/cooking utensils
• Pizza set	• Dollhouse/figurines
• Building blocks/K'nex	• Play tool set
• Toy cars and road rug	• Animals and barn
• Basketball and basket	• Bowling set
• Golfing set	• Doctor set and teddy bear

Toys and games were selected in random order for each dyad. The children played with each activity for a maximum of ten minutes, at which time a new activity was randomly selected. The participants were not given a choice of toys in order to avoid conflict. All activities that were not in use were kept in a closed storage container so that the children did not become distracted by multiple activities.

In order to obtain data that exhibited the subjects' best efforts, the researcher told the children that they should play together with each toy/game. Siblings and peers were told to do their best to engage the child with autism. No further instructions or prompts were provided. The researcher did not initiate additional interaction unless prompted by either child, in which case the researcher answered questions or made comments, but did not interact with the toy directly. In the case that a participant persistently attempted to interact with the researcher, the child was reminded that the researcher was there to watch, and that he or she should play with the child with autism. A new toy/game was presented to the children approximately every five to ten minutes. If no communicative interaction occurred within five minutes of presenting a toy, a new

toy was provided. If the subject showed no interest in the toy/game after three minutes, it was removed and a new toy/game was presented. The same procedure was applied for both groups.

The participants were observed for a total of two hours (two 60-minute sessions) with a sibling, and two hours (two 60-minute sessions) with a peer. All observations took place on separate days. Participants were videotaped for research purposes only, and videos were seen only by those involved with the research. Data were recorded regarding the subjects' social interaction skills. The researcher tallied the number of times each subject demonstrated joint attention, initiation, imitation, and turn-taking behaviors. If either child in the dyad displayed acts of aggression toward the other during the observation, the researcher took action to protect the children.

### **Reliability**

The researcher watched all taped sessions and recorded data from the videos. Actions that qualified for data collection were previously determined and presented in Figures 2-5. A licensed speech-language pathologist watched 10% of the videos and independently collected data, as well. These data were then compared to the researcher's data to ensure inter-rater reliability. Percentage of agreement on data collected on joint attention was 92%. Percentage of agreement for data collected on initiation was 90%. Percentage of agreement for data collected on imitation was 75%. Percentage of agreement for data collected on turn-taking was 85%. Overall inter-rater reliability was calculated at 85.4%.

**Validity**

Validity was addressed by ensuring that all subjects were treated equally and by controlling potentially confounding variables. Controlling extraneous variables allowed the researcher to attribute any difference in the dependent measure to the active independent variable (i.e., the play partner, sibling or peer). Validity of the findings was further enhanced by the use of nonparametric and descriptive statistical analyses.

**Data Analysis**

Data were collected following video review of the recorded sessions. Data were tabled and figures were constructed to depict the performance of each of the four measures for each group, as well as for individual subjects. Mann-Whitney U tests, a type of non-parametric significance test, were applied to determine whether there was a statistically significant difference between the two groups for joint attention, initiation, imitation, and turn-taking. Descriptive statistics (mean, standard deviation) were also applied to further capture the nature of the findings.

## **Chapter IV Results**

### **Impact of Siblings and Peers on Social-Pragmatics**

This study sought to determine whether peers or siblings have a greater impact on emerging social-pragmatic skills of children with autism. Data were collected from structured play sessions of six children with autism and their siblings and peers. While the researcher planned to collect data over two 60-minute sessions for each subject with a sibling and a peer, methods had to be altered due to availability of peers and siblings. As such, the data set was comprised of a total of thirteen sibling sessions, and six peer sessions. Sibling sessions consisted of three 60-minute sessions each from subjects 1 and 4, two 60-minute sessions each from subjects 3, 5, and 6, and one 40-minute session from subject 2. Peer sessions consisted of two 60-minute sessions from subject 1, two 40-minute sessions from subject 2, and one 40-minute session each from subjects 1 and 4. Subjects 3, 5, and 6 did not complete peer sessions due to lack of peer availability.

Data for all 40-minute sessions (five sessions) were extrapolated to reflect approximate values that would have occurred in 60-minutes. This was done in order to compare behaviors across sessions in a more uniform manner. Data were extrapolated by taking one half of the amount of behaviors noted in the 40-minute sessions and adding that number to the total number of behaviors that occurred in the 40-minute session. For example, during subject 2's sibling session, the subject displayed 32 instances of turn-taking in a 40-minute period. To extrapolate the data, the number of occurrences (32) was divided by two (16),

and this number was then added to the total number of occurrences (32+16) to approximate the number of times the subject would have displayed turn-taking during a 60-minute period (48).

Mann-Whitney U tests were used to determine variance between the two groups due to the small sample size. Tables and figures were constructed for visual inspection. Descriptive statistics (mean, range) were also used to characterize the results.

Table 7 presents the number of occurrences for all four social-pragmatic skills that were observed during sibling sessions. The table is divided by subjects and sessions.

**Table 7.** Occurrence of Social-Pragmatic Behavior with Siblings

Subject:Session	S1:1	S1:2	S1:3	S2:1	S3:1	S3:2	S4:1	S4:2	S4:3	S5:1	S5:2	S6:1	S6:2
Joint Attention	4	5	4	10*	2	9	11	7	3	7	8	20	19
Initiation	0	5	5	3*	17	13	26	47	21	47	24	48	24
Turn-Taking	26	23	28	48*	15	10	13	34	26	43	41	90	32
Imitation	9	6	8	7*	1	2	3	5	7	7	2	10	9

\* Data were extrapolated

Table 8 presents the descriptive statistics for the social-pragmatic behaviors elicited during sibling sessions.

**Table 8.** Average Social-Pragmatic Behavior with Siblings

	Joint Attention		Initiation		Turn-Taking		Imitation	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
<b>Subject 1</b>	4.33	4-5	3.3	0-5	25	23-26	7.7	6-9
<b>Subject 2</b>	10	—	3	—	48	—	7	—
<b>Subject 3</b>	5.5	2-9	15	13-17	12.5	10-15	1.5	1-2
<b>Subject 4</b>	7	3-11	31.3	21-47	24.3	13-34	5	3-7
<b>Subject 5</b>	7.5	7-8	35.5	24-47	42	41-43	4.5	2-7
<b>Subject 6</b>	19.5	19-20	36	24-48	61	32-90	9.5	9-10

Table 9 presents the number of occurrences for all four social-pragmatic skills that were observed during peer sessions. The table is divided by subjects, and sessions for the three subjects that were observed with peers.

**Table 9.** Occurrence of Social-Pragmatic Behavior with Peers

<b>Subject:Session</b>	<b>S1:1</b>	<b>S1:2</b>	<b>S1:3</b>	<b>S2:1</b>	<b>S2:2</b>	<b>S4:1</b>
<b>Joint Attention</b>	4	4*	5	7*	10*	15*
<b>Initiation</b>	2	0*	12	10*	19*	38*
<b>Turn-Taking</b>	5	14*	17	22*	32*	37*
<b>Imitation</b>	5	0*	2	4*	4*	7*

\* Data were extrapolated

Table 10 presents the descriptive statistics for the social-pragmatic behaviors elicited during peer sessions. The mean and range of the number of times each subject demonstrated a behavior is displayed.

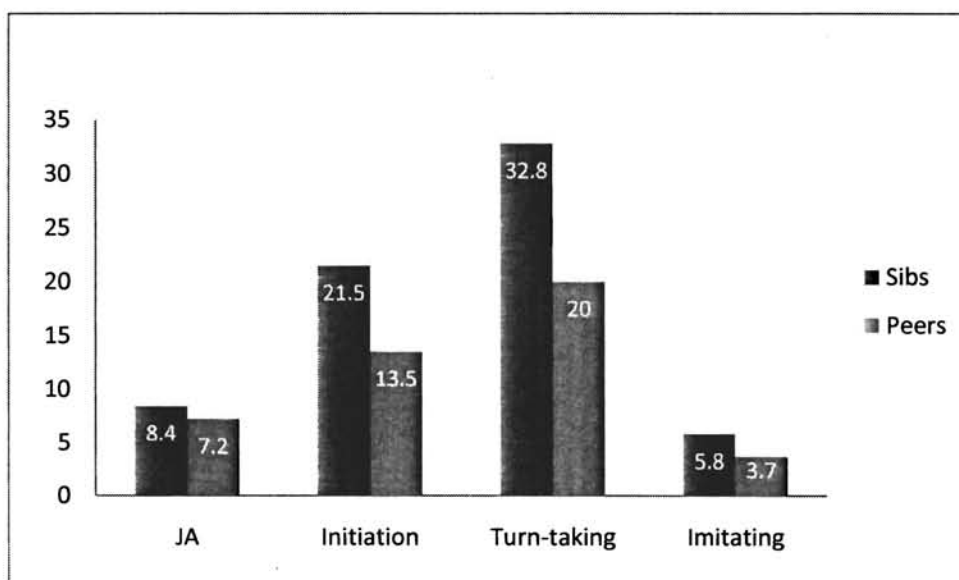
**Table 10.** Average Social-Pragmatic Behavior with Peers

	Joint Attention		Initiation		Turn-Taking		Imitation	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
<b>Subject 1</b>	4.3	4-5	4.6	2-12	12	5-17	2.3	2-5
<b>Subject 2</b>	8.5	7-10	14.5	10-19	27	22-32	4	4
<b>Subject 4</b>	15	—	38	—	37	—	7	—

Application of Mann-Whitney U tests revealed no significant difference between siblings and peers in the amount of joint attention facilitated during play sessions with children with autism [ $U(17)=34.5$ ;  $p=.879$ ]. Likewise, there was no significant difference in the amount of initiation [ $U(17)=24.5$ ;  $p=.392$ ], turn-taking [ $U(17)=21.0$ ;  $p=.227$ ], or imitation [ $U(17)=22.0$ ;  $p=.264$ ] displayed with siblings and peers.

Figure 1 displays the overall results comparing social skills elicited during sibling sessions versus peer sessions. The numbers represent the average number of times each behavior occurred within a 60-minute session.

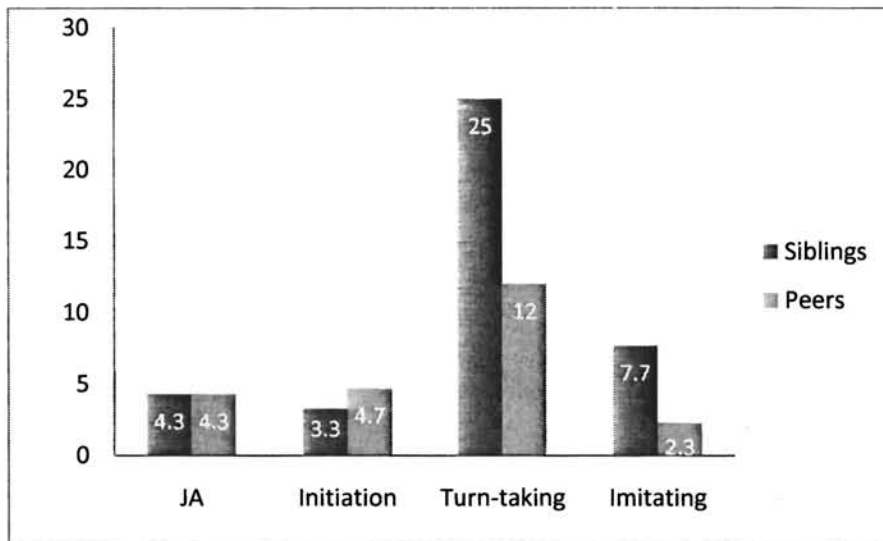
**Figure 1.** Average Social Behaviors per Hour



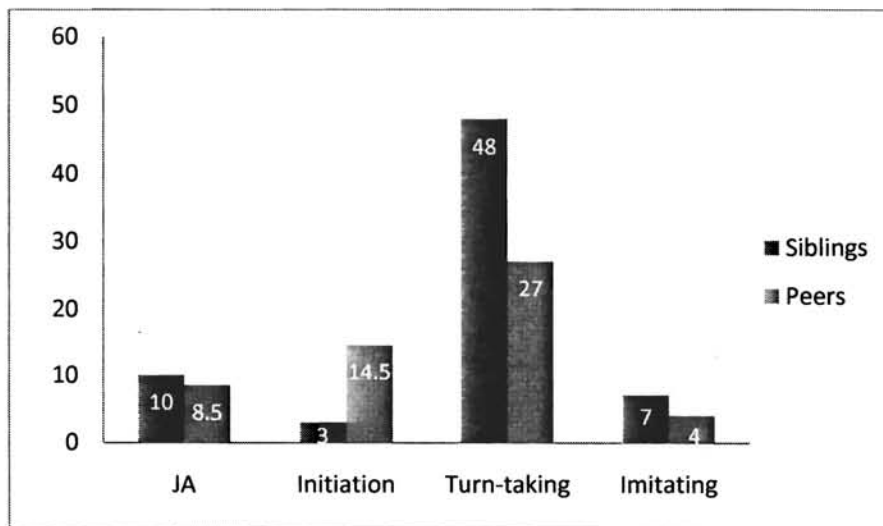
Though group analysis did not demonstrate a statistically significant difference in the overall amount of social-pragmatic interaction elicited by siblings versus peers, there was some variance observed for individual subjects. For this reason, the researcher elected to perform individual subject analyses. The

following figures display results for subjects 1, 2, and 4 who were observed with both siblings and peers.

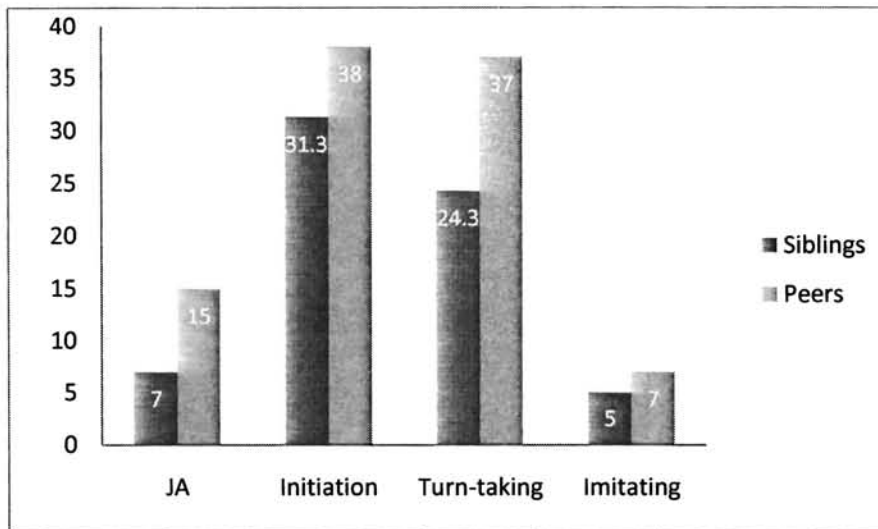
**Figure 2.** Subject 1 Sibling and Peer Sessions



**Figure 3.** Subject 2 Sibling and Peer Sessions





**Figure 4.** Subject 4 Sibling and Peer Sessions

Results for individual subjects observed with both siblings and peers revealed variation between subjects. Subject 1 demonstrated more social pragmatic behaviors with his sibling in the areas of turn-taking and imitation, the same amount of joint attention with his sibling and a peer, and slightly more initiation with a peer. Subject 2 demonstrated similar results, displaying more joint attention, turn-taking, and imitation with his sibling, and slightly more initiation with his peer. Both of these subjects exhibited many more episodes of turn-taking with their siblings. Data for subject 4 was different from the first two subjects, as subject 4 displayed more joint attention, initiation, turn-taking, and imitation with her peer.

### **Techniques Demonstrated by Siblings and Peers**

To address the research question regarding the techniques demonstrated by siblings and peers to elicit social interaction from subjects, data were collected through video analysis. The researcher observed a variety of visual, verbal, and physical prompts used by participants to elicit social-pragmatic interaction from

the subjects. Types of elicitation techniques demonstrated by each participant were coded while watching videos of the play sessions, and compared across subjects. Though the success rate of each technique was not formally analyzed, the commonality in techniques displayed across participants was noted. Some techniques were used by all participants, while other techniques were demonstrated by few, or only one participant.

The most common technique used by participants was a verbal statement or command to cue the subject to demonstrate a social-pragmatic skill. Siblings and peers typically initiated an interaction with a verbal statement or question to the subject. Calling the subjects' names to gain attention was another common verbal cue that was provided by all participants. If a single verbal cue was not successful, most participants continued to prompt by using an additional verbal prompt, or pairing the same verbal prompt with a visual or physical prompt. Less common prompts included hand-over-hand modeling, imitating the subject to interest him or her in socially interacting, and using a visual or physical cue in isolation. Table 11 displays the techniques used by siblings and peers to elicit social-pragmatic behaviors for all subjects.

**Table 11.** Techniques Used to Elicit Social-Pragmatic Behavior

Subject	Sibling	Peer
1	<ul style="list-style-type: none"> <li>Repeated subject's name to gain attention</li> <li>Told subject to "watch"</li> <li>Said "here" while holding out an object for subject to take</li> <li>Asked simple yes/no questions</li> <li>Repeated questions</li> <li>Used persistent requests until subject complied</li> <li>Imitated subject to elicit further interaction</li> </ul>	<ul style="list-style-type: none"> <li>Repeated subject's name to gain attention</li> <li>Held objects out for subject to look at/take</li> <li>Demonstrated use of objects for subject to imitate</li> <li>Told subject to "look"</li> </ul>
2	<ul style="list-style-type: none"> <li>Hand-over-hand support</li> <li>Verbally and physically redirected to joint activities</li> <li>Handed objects to subject</li> </ul>	<ul style="list-style-type: none"> <li>Called subject's name to gain attention</li> <li>Modeled an action, then gave object to subject to imitate the action</li> <li>Touched subject's arm to gain attention</li> <li>Used combination of verbal + tactile cues to gain attention</li> </ul>
3	<ul style="list-style-type: none"> <li>Repeated subject's utterances</li> <li>Held objects out for subject to look at</li> <li>Took objects that the subject was playing with</li> <li>Yelling and making noises to get the subject's attention</li> </ul>	
4	<ul style="list-style-type: none"> <li>Repeated subject's name to gain attention</li> <li>Used verbal + tactile + visual prompts to gain attention</li> <li>Demonstrated actions for the subject to imitate</li> <li>Used play routines for toys/games that subject had played with before</li> </ul>	<ul style="list-style-type: none"> <li>Repeated subject's name to gain attention</li> <li>Verbally cued subject to play with joint object/instructed subject to imitate</li> <li>Used play routines for toys/games</li> <li>Gave subject directions for cleaning up each activity</li> <li>Asked subject questions about activities</li> </ul>
5	<ul style="list-style-type: none"> <li>Used verbal cues</li> <li>Used indirect language to attempt to get subject to participate in joint activities</li> </ul>	
6	<ul style="list-style-type: none"> <li>Repeated subject's name to gain attention</li> <li>Persistently repeated questions to elicit response</li> <li>Used verbal cues to gain attention</li> <li>Used verbal + tactile to gain attention</li> <li>Used progressive simplification of questions (open-ended to multiple choice to yes/no) to elicit response</li> <li>Imitated subject to elicit further interaction</li> </ul>	

## **Chapter V**

### **Discussion**

#### **Summary of Results**

The purpose of this research study was to determine the impact that siblings and peers have on the social-pragmatic interaction of children with autism. Specifically, the researcher examined the ability of siblings and peers to elicit joint attention, initiation, turn-taking, and imitation from the subjects. The researcher also examined whether siblings or peers elicited more behaviors from the subjects, and techniques that the participants used to elicit interaction. Two groups of subjects were included in this study: subjects paired with a sibling (N=6), and subjects paired with a familiar peer (N=3). There were a total of six subjects; all subjects were observed with siblings, and three subjects were also observed with a peer. Prior research showed that both sibling- and peer-mediated therapy have a positive impact on social skill acquisition of children with autism (Bass & Mulick, 2007; El-Ghoroury & Romanczyk, 1999; Garfinkle & Schwartz, 2002; Harper, Symon, & Frea, 2008; McConnell, 2002; Tsao & Odom, 2006). This study compared the amount of social-pragmatic behavior that occurred during structured play sessions with a sibling and those with a peer.

Data from this study revealed no statistically significant differences in the average amount of joint attention, initiation, turn-taking, or imitation displayed by subjects with autism when interacting with siblings or familiar peers. Siblings and peers used similar techniques for eliciting social-pragmatic behaviors from the subjects. Some subjects displayed more social interactions with siblings who

they saw on a daily basis, while others exhibited more social interactions with familiar peers with whom they did not interact regularly.

### **Analysis of Sibling versus Peer Impact**

Overall, there were no significant differences in the average amount of joint attention, initiation, turn-taking, or imitation displayed by subjects in the sibling group versus subjects in the peer group. There were, however, some noticeable differences for individual subjects when observed with a sibling and a peer.

Results suggested that both play partners may have a positive impact on the social-pragmatic skills of children with autism during structured play sessions. Individual results suggested that the number of social-pragmatic behaviors displayed may depend on the relationship with the play partner involved. Subjects 1 and 2 displayed more social behaviors when observed with their sibling, but subject 4 displayed more social pragmatic behaviors in all four categories when observed with her peer. These individual results suggested that considerations need to be made before selecting a typically-developing play partner to participate in structured play sessions for a child with autism. A sibling should not be chosen simply because he or she is often available for the child with autism to play with. Rather, the play partner's attitude, motivation, playfulness, and ability to use strategies should be considered. If a peer displays positive behaviors, such as these that are conducive to encouraging the child with autism to interact, the peer should be considered for the play sessions. Choosing a play partner who displays qualities such as those mentioned

previously, may make a considerable difference in the amount of socialization that the child with autism presents.

The play partners of subject 4 demonstrate how the techniques used impact the amount of social-pragmatic behavior displayed by the subject. Subject 4 had more social interaction in all areas measured with a peer. The difference between the sibling and peer of subject 4 was that the peer was more assertive in her interactions with the subject. The sibling of subject 4 used strategies such as demonstrating use of toys and introducing play routines. Subject 4's peer used these same strategies, but also gave the subject verbal directions, and asked questions frequently to encourage interaction. In contrast, subject 2 displayed more social-pragmatic behaviors when interacting with his sibling. Like the peer of subject 4, subject 2's sibling was more assertive in the techniques used. Subject 2's peer called the subject's name, modeled actions, and touched the subject's arm to get attention. The sibling demonstrated these same techniques, but when the subject didn't respond, the sibling used additional techniques to elicit interaction. For example, if touching the subject's arm was not effective in directing him to a new activity, the sibling physically moved the subject to the new activity. Additionally, if the sibling handed the subject an object and the subject still did not interact, the sibling used hand-over-hand prompts to encourage the subject to interact.

### **Analysis of Techniques Used to Elicit Social-Pragmatic Behavior**

The second research question regarded the techniques that siblings and peers exhibited to facilitate social-pragmatic interaction from the subjects with

autism. During each play session, all peers and siblings made multiple attempts to facilitate social-pragmatic interaction, although some made more than others. Techniques utilized by siblings and peers were similar, as most children demonstrated variations of the same strategies.

Verbally cueing the subjects was the most common technique used by siblings and peers. Participants used verbal cues to gain the subjects' attention, get the subjects to take a turn during a game, or to make the subjects look at an object. When one verbal cue was not successful in isolation, some siblings or peers repeated the subject's name until they got a response. Most participants used multiple visual and tactile cues when trying to elicit social-pragmatic interaction. Some participants resorted to handing the subject an object when it was his or her turn in order to elicit turn-taking. For example, the peer of subject 2 frequently initiated with a repeated verbal cue (e.g., calling the subject's name). When he was not successful in gaining the subject's attention, he touched the subject's arm or put an object on his arm.

Another common technique for eliciting social-pragmatic interaction was repeating or simplifying questions. The sibling of subject 1 did this frequently, by asking the subject an open-ended question (e.g., Which one do you want?). When the subject did not respond, the sibling progressed to giving the subject choices (e.g., Do you want the blue car or the red car?). When the subject was still unresponsive, the sibling asked a yes/no question (e.g., Do you want the red car?). Though this sibling did not always ask questions in this order, she varied her question to give the subject multiple opportunities to respond.

A variation of the verbal cue demonstrated by other participants was giving the subject an explicit job during play. For example, siblings of subjects 1, 4, 5, and 6, and the peer of subject 4 all gave direction to “be the doctor” at least once when playing with the doctor kit. Additional role playing assignments were observed during play with the house and dolls, barn and animals, and pretend food. Subjects 4 and 6 responded well to being assigned a role, displaying increased social-pragmatic behaviors and appropriate play (e.g., using doctor instruments to check sibling/peer).

Subject 1’s sibling had success in eliciting social interaction when she used established play routines. For example, when presented with a puzzle, the pair immediately began a script for puzzle play that was familiar to them. The sibling took all of the pieces out of the puzzle, and then asked the subject, “Where’s the \_\_\_\_\_?” to cue him to engage in play. The subject picked up the piece named by the sibling, and said, “Here it is.” The sibling said, “You found it!” and showed him where to put the piece in the puzzle. This script continued for all puzzle pieces during completion of both puzzles that were presented. Subject 5 and subject 6 displayed similar scripted play patterns with their siblings. These sibling dyads were familiar with turn-taking games, as both subjects and siblings announced when it was the other’s turn. These kinds of structured scripts kept the subjects engaged throughout the entire activity, and supported social-pragmatic interaction between the sibling pairs.

The siblings of subjects 4 and 6 used a similar technique of imitating the subject in order to expand social-pragmatic interaction. Both demonstrated this



technique while playing with the dollhouse. The sibling of subject 4 watched the subject place her dolls in a line while the subject chanted, "We're going to the beach! We're going to the beach!" The typically-developing sibling then lined up her dolls behind the subject's, and joined in the chant. This technique of imitating the subject expanded the dialogue and turn-taking between the subject and sibling. A similar situation occurred with subject 6 and his sibling. The subject made his doll knock on the door of the house to initiate interaction with his sibling who was playing inside of the house with her doll. When the sibling made her doll answer the door, the subject and sibling engaged in an exchange. Afterward, they resorted to parallel play. The sibling wanted the subject to play with her again, but was unsuccessful in her next attempt. She reverted back to the subject's strategy of making the doll knock on the door. The subject was immediately engaged, and a play interaction similar to the first occurred. In these two cases, the siblings imitated the subjects' actions to expand the play interactions.

A less common technique used by subject 2's sibling was to provide hand-over-hand cueing to get him to participate in a bowling activity. The sibling handed the subject a ball and told him to roll it; when the subject did not respond, the sibling put her hand over his and made him release the ball. Using hand-over-hand support was successful for engaging this particular subject in social-pragmatic interaction, but was not demonstrated by other participants.

Another low-frequency technique was displayed by subject 3's sibling. This participant often attempted to initiate interaction by holding up objects for the

subject to look at. Based on the amount of turn-taking that occurred compared to other dyads, this technique was not very successful. The sibling of subject 3 was the youngest participant in the study at 2:7, which likely impacted his difficulty eliciting social-pragmatic interaction from the subject. This strategy was probably used less often by other participants because they were older and understood that simply holding out an object with no physical or verbal cues would not be sufficient for gaining the attention of a child with autism. As mentioned previously, most participants initiated with a verbal prompt, and continued to add combinations of visual and physical prompts to gain subject attention.

From the data collected, conclusions could not be drawn regarding which techniques were most effective. However, it was noted that some techniques worked better for some subjects than others. For example, using a combination of visual, verbal, and tactile cues simultaneously was an effective strategy used by subject 6's sibling. This subject did not respond well to cues in isolation, but when the sibling used multiple cues combined, the subject often responded. In contrast, subject 2 did not respond well to multiple cues used simultaneously. When subject 2's peer attempted to use multiple cues, the subject became overstimulated and displayed fewer social-pragmatic behaviors. From these observations, it can be concluded that individual children respond differently to a variety of techniques used to elicit social-pragmatic interaction. During this study, it was the typically-developing play partner's responsibility to determine which strategies were most effective. However, for future sibling- and peer-mediated therapy, the supervising adult can help the play partner determine

which techniques are most successful and encourage the use of those techniques.

### **Clinical Implications**

This study explored the importance of structured play in the development of social-pragmatic skills of children with autism. Though siblings and peers were not formally trained to provide therapy, all participants used strategies and techniques that many professionals use to elicit social-pragmatic behavior from children with autism. Structured play involved interactions conceived and executed by the children alone with no training, yet the researcher structured the play sessions. The researcher selected one toy at a time from a pool of preselected activities, and instructed the children to play with each other. Given these simple instructions, most siblings and peers made a sustained effort to engage the subjects.

The results suggest that sibling- and peer-mediated therapy can be successful in helping children with autism acquire social-pragmatic skills. They also suggest that social learning can be facilitated by untrained familiar partners, such as parents, caregivers, or siblings. Implementing daily structured play sessions for children with autism may have a positive impact on their social-pragmatic skills. During the study, subjects and play partners developed scripts and play sequences for many activities indicating that varied social scripts may increase the social-pragmatic repertoire of children with autism.

This study also showed the importance of the relationship and comfort level between the child with autism and his/her sibling or peer. One might think

that a child with autism would be more comfortable and interactive with a partner they see every day, but this was not the case for all subjects. The number of interactions displayed by subjects seemed to be influenced more by the assertiveness of the play partners. Siblings and peers who repeated themselves until they got a response were more successful in eliciting social pragmatic behaviors than play partners who were not persistent. Additionally, play partners who assigned jobs to the subjects during various activities facilitated increased interaction. Siblings and peers who did not offer toys to the subjects or demonstrate use of toys elicited fewer social pragmatic interactions. If speech-language pathologists or other professionals choose to implement sibling- or peer-mediated therapy, choosing an appropriate social play partner may have a significant impact on the success of therapy.

### **Strengths of the Study**

All data were collected by the primary researcher to insure that all sessions were structured in the same manner. Providing a pool of games and toys for play provided consistency between subjects and sessions. The games and toys chosen for the study were specifically selected because they held potential to create interaction between two individuals, versus toys and games that could be used in an individual manner. Since the toys and games were common, participants may have had some knowledge about how to interact with them. This allowed for maximal play time, rather than time spent explaining how to play with each activity. An additional strength of the study was clear

definitions for the social-pragmatic behaviors analyzed, including lists of example behaviors to assist in accurate coding and counting.

### **Limitations of the Study and Need for Future Research**

A low subject pool was the primary limitation to the study. There were multiple factors that impacted subject availability. The first was family concern regarding the time commitment for the observations. Parent work, extracurricular activities, and speech, occupational, and physical therapy were all activities mentioned that kept families from participating.

Though the original intent of the study was to observe each subject with a sibling and a peer, half of the subjects did not have peers to interact with, for various reasons. One family recently moved to this country, and the subject did not have friends or cousins in the area. Parents of the other two subjects were not familiar with any typically-developing peers from school or the community that would be willing to interact with their children with autism. This limited the amount of data that could be obtained regarding the peers' ability to elicit social-pragmatic behaviors from subjects, and could have negatively impacted the validity of the findings.

Further research is needed with more subjects to verify that there is not a significant difference in social skills displayed when interacting with siblings versus peers. The following are research questions that should be addressed in future research:

1. Is the amount of social-pragmatic interaction elicited from children with autism directly related to the amount of training that siblings and/or peers have received in providing therapy?
2. Does age difference or the amount of time that the subject and peer- or sibling-mediator regularly spend together affect the success of the social-pragmatic intervention?
3. Do regularly scheduled structured play sessions increase the social skills of children with autism over time?
4. Which methods used by siblings/peers are most effective in eliciting social language/behavior from children with autism?

## **Conclusions**

Research regarding the relationships of siblings and peers to children with autism has examined the success of peer- or sibling-mediated therapy. Both peer- and sibling-mediated therapy have been shown to be proficient in increasing social-pragmatic abilities of children with autism (Bass & Mulick, 2007; El-Ghoroury & Romanczyk, 1999; Garfinkle & Schwartz, 2002; Harper, Symon, & Frea, 2008; McConnell, 2002; Tsao & Odom, 2006). Little research has focused on the effects of siblings and peers with no formal training on the social development of children with autism.

The present study set out to determine if siblings or peers of children with mild to moderate autism were better able to elicit social-pragmatic skills. Specifically, joint attention, initiation, turn-taking, and imitation were observed. These four social skills are difficult for children with autism, and are often

targeted during speech and language therapy. This study showed how siblings and peers elicit these skills within a structured naturalistic play setting, given no training. Speech-language pathologists are constantly searching for ways to teach social skills to children with autism within a naturalistic context. This study concluded that both siblings and peers are able to elicit many instances of social-pragmatic interaction in all four areas measured. This suggests that engaging in structured play sessions on a regular basis may encourage social skill development in children with autism.

When selecting a play partner or sibling/peer mediator for therapy, parents or therapists need to observe the relationship between the child with autism and the sibling or peer. The bond that the two children share may be an important factor to consider. The parents or therapists should also consider the strategies that play partners use to elicit social pragmatic behaviors from the children with autism. Some children use better strategies and persevere more than others. In this study, play partners who were more assertive and made more attempts to interact were more successful in eliciting social behaviors from the subjects. Parents and therapists should put thought into choosing a play partner as this individual may have a significant impact on the social skill development of the child with autism.

In this study, all play partners were able to elicit social pragmatic behaviors from the children with autism during guided naturalistic play sessions. Some siblings and peers were more successful than others. Success seemed to depend on the assertiveness of the play partner and the strategies that each play

partner used. This study showed that guided naturalistic play with siblings or peers holds promise for encouraging social pragmatic behaviors for children with autism. This practice may be an effective complement to speech-language therapy and other interventions for children with autism.



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**Appendix A**  
**Institutional Review Board Approval**

Thank you for submitting the research protocol titled, "Effects of Siblings or Peer on Social Interaction of Children with Autism" for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has Approved this research protocol following an Expedited Review procedure. IRB review has determined that the protocol involves no more than minimal risk to subjects and satisfies all of the criteria for approval of research.

This protocol has been given the IRB number 10-006. You may proceed with this study from 1/14/2010 to 1/13/2011. You must submit Form E, Continuation Request, to the IRB by 12/13/2010 if you wish to continue the project beyond the approval expiration date.

This approval is valid only for the research activities, timeline, and subjects described in the above named protocol. IRB policy requires that any changes to this protocol be reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board  
c/o Office of Research and Sponsored Programs  
Telephone: 581-8576  
Fax: 217-581-7181  
Email: [eiuirb@www.eiu.edu](mailto:eiuirb@www.eiu.edu)

Upon completion of your research project, please submit Form G, Completion of Research Activities, to the IRB, c/o the Office of Research and Sponsored Programs.

Thank you for your assistance, and the best of success with your research.

John Best, Chairperson  
Institutional Review Board  
Telephone: 581-6412  
Email: [jbbest@eiu.edu](mailto:jbbest@eiu.edu)

**Appendix B**  
**Institutional Review Board Modification Approval**

Thank you for submitting proposed modifications to the research protocol titled "Effects of Siblings or Peer on Social Interaction of Children with Autism", IRB number 10-006, for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has reviewed and approved your proposed modifications to the protocol. The approval is effective 7/28/2010. You may continue with your research through 1/13/2011.

The approval of this protocol and its modifications is valid only for the research activities, timeline, and subjects described in the above named protocol. IRB policy requires that any changes to this protocol be reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board  
c/o Office of Research and Sponsored Programs  
Telephone: 581-8576

Upon completion of your research project, please submit Form G, Completion of Research Activities, to the IRB, c/o the Office of Research and Sponsored Programs.

Thank you for your assistance, and the best of success with your research.

Robert Chesnut, Chairperson  
Institutional Review Board  
Telephone: 581-2125  
Email: [rwchesnut@eiu.edu](mailto:rwchesnut@eiu.edu)

**Appendix C**  
**Participant Consent Form**

**CONSENT TO PARTICIPATE IN RESEARCH**

Effects of sibling or peer on social interaction of children with autism

You are invited to participate in a research study conducted by Laura Welsh and Dr. Tina Veale, from the Communication Disorders and Sciences department at Eastern Illinois University. Your participation in this study is entirely voluntary. Please ask questions about anything you do not understand, before deciding whether or not to participate.

• **PURPOSE OF THE STUDY**

The purpose of this research is to determine how a sibling or peer may affect joint attention, initiation, and turn taking behaviors in five- to ten-year-old children with autism. Joint attention involves the child's ability to participate in an activity by demonstrating eye contact toward the object and the communication partner, and by reacting to the communication partner's gestures and eye gaze. Initiation occurs when the child begins an interaction with a partner. Turn taking is present when the child is able to take turns in a conversation or activity by responding to a play partner's action or question/comment.

• **PROCEDURES**

If you volunteer your child to participate in this study, he or she will be asked to:

Engage in social interaction with his or her sibling and peer. The two children involved will be presented with toys and games, and the researcher will tell the children that she would like to see how they play together. A new toy or game will be presented to the children every five to ten minutes, at which time the first toy or game will be removed. If the subject does not interact with the toy or game after three minutes, a new game or toy will be introduced. The same procedure will occur for each observation.

Each participant will be observed with a sibling over 3 visits that will each last for 40 minutes. Each participant will also be observed with a peer over 3 separate visits that will also last for 40 minutes each. There will be a total of 6 observations occurring on different days which will add up to 4 total hours of observation. Depending on the location that your child is derived from, the observation will either take place in your home or in a therapy room at the Eastern Illinois University Speech-Language-Hearing clinic.

Participants will be videotaped for research purposes only, and videos will only be seen by those involved with the research.

- **POTENTIAL RISKS AND DISCOMFORTS**

Overall risks in this study are minimal. Physical inconveniences are not likely to occur during this study. The child is at slight risk for becoming frustrated in having to share toys or games with another child. They may become upset because only one object will be presented at a time, and the presented object may not be desired. If significant frustration is observed by the researcher, the observation will be discontinued, and will continue on a different day.

- **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

The participant may benefit from the opportunity to directly engage with a sibling and peer during the observation because an optimal environment will be provided to encourage interaction.

The information obtained from this study may benefit other speech-language pathologists as well as parents. Parents will benefit from receiving the results of the study by learning additional information about autism and how social skill development is affected. Results will determine whether direct interaction with a sibling or peer is beneficial to the social skills of a child with autism. It will allow us to determine whether using a sibling or peer for increasing social interactions of a child with autism would be effective or not.

- **CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of storing all data and video clips in a locked drawer at the Eastern Illinois University Speech-Language-Hearing clinic. The primary researcher, committee members, and faculty research supervisor are the only individuals that will come in contact with the data or video clips obtained. All data and video clips will be kept in a locked drawer in the faculty research supervisor's office for three years after the study is complete. At this time, all data and video files will be removed from the jump drives in which they will be saved on.

- **PARTICIPATION AND WITHDRAWAL**

Participation in this research study is voluntary and not a requirement or a condition for being the recipient of benefits or services from Eastern Illinois University or any other organization sponsoring the research project. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind or loss of benefits or services to which you are otherwise entitled.

You may also refuse to answer any questions you do not want to answer. There is no penalty if you withdraw from the study and you will not lose any benefits to which you are otherwise entitled.

• **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about this research, please contact:

*Primary Researcher:*

Laura Welsh, B.S.  
Eastern Illinois University  
Speech-Language-Hearing Clinic  
600 N. Lincoln Ave.  
Charleston, IL 61920  
lewelsh@eiu.edu  
(217) 725-9305

*Committee Members:*

Mrs. Trina Becker, M.S. CCC-SLP  
Eastern Illinois University  
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Speech-Language-Hearing Clinic  
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*Faculty Research Supervisor:*

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Speech-Language-Hearing Clinic  
600 N. Lincoln Ave.  
Charleston, IL 61920  
tkveale@eiu.edu  
(217) 581-2712

## • RIGHTS OF RESEARCH SUBJECTS

If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board  
Eastern Illinois University  
600 Lincoln Ave.  
Charleston, IL 61920  
Telephone: (217) 581-8576  
E-mail: [eiuirb@www.eiu.edu](mailto:eiuirb@www.eiu.edu)

You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

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I hereby consent to the participation of \_\_\_\_\_, a  
minor/subject in the investigation herein described. I understand that I am free to withdraw my  
consent and discontinue my child's participation at any time.

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Signature of *Minor/Handicapped Subject's* Parent or Guardian      Date

I hereby consent to the participation of \_\_\_\_\_, a  
minor/subject in the investigation herein described. I understand that I am free to withdraw my  
consent and discontinue my child's participation at any time.

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Signature of *Minor Peer/Sibling Subject's* Parent or Guardian      Date

I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent  
and discontinue my participation at any time. I have been given a copy of this form.

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Signature of Sibling      Date

I voluntarily agree to participate in this study. I understand that I am free to withdraw my consent  
and discontinue my participation at any time. I have been given a copy of this form.

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Signature of Peer      Date

I, the undersigned, have defined and fully explained the investigation to the above subject.

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Signature of Investigator      Date